METRO TORONTO REMEDIAL ACTION PLAN

Stage 1: Executive Summary

Remedial Action Plan
Plan d'Assainissement

Canada Ontario

METRO TORONTO REMEDIAL ACTION PLAN

ENVIRONMENTAL CONDITIONS AND PROBLEM DEFINITION

EXECUTIVE SUMMARY

Environment Canada

Environment Ontario

Ministry of Natural Resources

Metropolitan Toronto and Region Conservation Authority

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I. INTRODUCTION

The International Joint Commission (IJC) has identified through its Great Lakes Water Quality Board, 42 areas of concern in the Great Lakes basin. These are areas where special efforts are needed to restore water uses and protect water supplies, recreation and aquatic life. The Metro Toronto waterfront was identified as one of these Areas of Concern.

Environment Ontario and Environment Canada are jointly committed to co-ordinating the preparation of the Metro Toronto Remedial Action Plan (RAP). This plan is aimed at restoring and protecting the quality of Lake Ontario along Metro's waterfront, stretching from Etobicoke Creek to the Rouge River. The plan will include all watersheds draining this area.

Metropolitan Toronto has been the subject of intense study for many years. Numerous actions have been undertaken to remedy known problems, with varying degrees of success. The Metro Toronto RAP will build upon past and on-going efforts and will establish the actions, resources, and schedules necessary to restore beneficial uses. As a basis for this work, the RAP Team has prepared a technical report entitled "Environmental Conditions and Problem Definition" which summarizes the most recent information on the status of the aquatic environment, use impairment, sources of contamination and remedial measures underway and planned.

This executive summary provides an overview of the conditions along the Metro Toronto waterfront. More detailed information may be obtained by referring to the main report.

II. ENVIRONMENTAL CONDITIONS

The Metro Toronto waterfront is affected by bacteria, nutrient, heavy metal and organic chemical contamination primarily as a result of inputs from water pollution control plants (WPCPs), combined sewers and storm sewers. The contamination has impaired some uses and raised concerns for the protection of others. Table II summarizes the environmental concerns and major contributing sources within the Metro Toronto RAP area.

Swimming

All of Metro's beaches have been posted in recent years, advising against bathing, because of high levels of fecal coliform (FC) bacteria. The number of beach postings increases as summer progresses due to increased bacteria survival in sediments in the warmer water, constant dry weather loadings and higher rainfall frequency.

Discharge from storm sewers and combined sewer overflows are the principal causes of bacterial contamination. These discharges affect the beaches directly through discharge to the lake and indirectly through discharge to the rivers. The importance of lake versus riverine discharge varies with beach location. The eastern beaches are affected primarily by direct sewer discharges to the lake. The western beaches are affected by both direct lake discharges and the Humber River.

Sewer discharges affect the beaches in both dry and wet weather. In dry weather, illegal sanitary connections to storm sewers, combined with infiltration to the storm sewers, produce a constant discharge from some sewers. In wet weather, overflows from combined sewers introduce diluted sanitary sewage and storm sewers discharge accumulations of fecal material from the urban watersheds. The large volume of water discharged during wet weather produces extensive contamination of beaches which may persist for days following a rainfall.

The greatest concern related to bacterial contamination has historically been associated with bathing beaches and the

Table II: Summary of Environmental Problems and Sources

Environmental Problem	Current Conditions	Impaired Uses	Source of Problems	Information Deficiencies
Bacteriological Contamination	Bacterial densities often exceed provincial health objectives in rivers and at public beaches	Swimming Windsurfing Aesthetic experience	Storm sewers Combined sewers Watershed runoff	
Heavy metals and toxic organics in water	Provincial objectives exceeded in rivers, near WPCP outfalls, and lakefilling operations	Fishery, other aquatic biota	Storm sewers Water Pollution Control Plants Combined Sewers Watershed runoff	Degree of biological impact Storm and combined sewer loads
Heavy metals and toxic organics in sediments	Sediments exceed provincial open water disposal guidelines in river mouths, embayments, and near point sources	Restrictions on dredging, bioaccumulation of contaminants in biota	Storm sewers Watershed runoff Combined sewers Water Pollution Control Plants Lakefilling	Degree of biological impairment corresponding to bioaccumulation levels
Contamination of edible fish flesh	Human consumption guidelines for mercury, PCBs, and Mirex exceeded in the larger sizes of several species	Advisories to restrict consumption have been issued	Lakewide sources Watershed runoff Water Pollution Control Plants Natural sources	Efforts to locate dispersed sources of PCBs have not been successful

Table II: Summary of Environmental Problems and Sources - Continued

Environmental Problem	Current Conditions	Impaired Uses	Source of Problems	Information Deficiencies
Contamination of biota	Elevated levels of metals and organics have been found in biota. IJC biota guidelines exceeded for PCBs in benthos and fish.	Fishery, other biota	Storm Sewers Combined sewers Watershed runoff In-place sediments Water Pollution Control Plants	Biological impact of body burden levels unknown Biological significance of sources unknown
Loss of Habitat	Existing habitats are effected by deposition of contaminated sediments and degradation of physical and chemical water quality	Fishery, other biota	Storm Sewers Watershed runoff Urban development Water Pollution Control Plants Combined sewers	Additional information on non-water quality limitations on habitat needed
Elevated Nutrient Concentrations	Provincial guidelines exceeded in water column and sediments WPCPs currently at or near compliance for effluent quality	Weed growth along western shoreline Benthic communities lack diversity	Water Pollution Control Plants Storm Sewers Watershed runoff	

near-shore waters adjacent to public beaches. Recent research has indicated the potential for an increased health risk for windsurfers in contaminated waters. Although local evidence of such health impacts is lacking, concerns must be extended to windsurfers and boaters (due to intentional capsizing). Since these uses occur across the waterfront, concerns over bacterial contamination cannot be restricted to the public beach areas alone.

Other Recreation

High nutrient levels can result in increased algae growth which can degrade the waters' aesthetics through increased turbidity and production of odours. Weed growth and production of filamentous algae (Cladophora) can impact on boating through the fouling of boat hulls and propellers. Detached algae can interfere with beach use.

Along most of the Toronto waterfront, algae and weed production is limited by a lack of suitable substrate and the effects of wave action. Cladophora growth along the western shoreline has been a problem because of high nutrient levels and availability of rocky substrate. The City of Etobicoke has successfully employed an algae skimmer to remove Cladophora close to the shoreline.

Phosphorus levels across the Toronto Waterfront often exceed the Environment Ontario guideline of 20 µg/l, which is recommended to avoid nuisance concentrations of algae in lakes. Phosphorus concentrations in Toronto's nearshore waters have decreased significantly since the late 1960's due to controls on the use of phosphates in laundry detergents and the implementation of phosphorus removal at water pollution control plants. In recent years, the decline in phosphorus concentrations has levelled off. Despite current phosphorus removal requirements, the treatment plant discharges remain the largest source of phosphorus to the waterfront.

In addition to elevated phosphorus levels, the water clarity in some areas is affected by suspended solids discharge from rivers and from lakefilling activities.

Fish Consumption

Environment Ontario has recommended restrictions on the consumption of the larger sizes of some species of fish caught in Toronto's waters because of the levels of mercury, PCBs and mirex. In recent collections, other contaminants, including pesticides, dioxins and heavy metals, have have not been found at concentrations which exceed health guidelines.

The restrictions on consumption which arise from mercury levels appear to be influenced by natural background sources. The levels of mercury found in species such as Northern Pike along the waterfront are not significantly different from those found in less urbanized areas of the province. It is not known whether elimination of human-related sources of mercury would be sufficient to allow a lifting of current advisories.

Except for those species restricted because of mercury alone, all other restrictions are based on exceedences of health guidelines for both PCBs and mirex. The latter contaminant has been shown to be the more limiting in the Toronto area because smaller sizes of fish exceed the guidelines for mirex without exceeding those for PCBs. The main source of mirex to Lake Ontario is the Niagara River (Occidental Chemical Co.) and as a result, consumption advisories related to mirex are likely to remain in place until remedial measures for the Niagara River are implemented.

PCB residues are a result of lake-wide and local inputs. PCBs have been rarely found in water samples, but accumulations in sediment and biota occur across the waterfront. PCB levels in biota are declining, but remain above objectives. The Humber River appears to be the most significant source of PCB contamination based on studies using spottail shiners. Efforts to trace the specific source of PCBs in the Humber River have been unsuccessful.

Aquatic Sediments

Contaminant levels in sediments show considerable variation across the waterfront. High levels of nutrients, organics, and metals occur in areas with poor water circulation (embayments, slips) and near tributary mouths and municipal discharges.

Contaminants originate from both point and non-point sources, and include nutrients (e.g. nitrogen, phosphorus), trace metals (e.g. copper, lead, mercury), and organics (e.g. volatiles, oil and grease, pesticides and PCBs). Point source contaminants to the Toronto waterfront include discharges from the Humber, Toronto Main, North Toronto (via the Don River), and Highland Creek WPCPs. Non-point sources include urban storm runoff, combined sewer overflow, and atmospheric deposition. Lakefilling activities, notably at the Eastern Headland, produce localized impacts on sediment quality and the related water quality.

Metro Toronto nearshore sediments are derived mainly from shoreline and bluff erosion, stream and river discharges, urban runoff, WPCP discharge and lakefilling activities. Shoreline and bluff erosion is a major source of the Toronto nearshore sediments.

Stream and river discharges from the six major watercourses within the Metropolitan region (namely, Etobicoke Creek, Mimico Creek, Humber River, Don River, Highland Creek and Rouge River) represent the second major source of sediment to the Toronto shoreline. Sediment production in the drainage basins results mainly from urban activities (e.g. construction), and, to a lesser extent, erosion of agricultural lands and streambanks. The degree of sediment bacterial and chemical contamination varies with the intensity and type of land use. The third source of sediment, and a primary source of contamination to the waterfront, are the water pollution control plants (WPCPs) and storm sewer discharges.

Humber Bay and the Inner Harbour possess the most highly contaminated sediments along the Toronto waterfront. The Eastern waterfront has the cleanest sediments. Within Humber Bay, contamination is widespread although there are distinct zones of degradation around the Humber River mouth and the

Humber WPCP. The north shore slips of the Inner Harbour are heavily contaminated. The embayment of Ashbridges Bay is also contaminated, though not to the extent of Humber Bay. The Outer Harbour exhibits intermediate sediment quality with the exception of a contaminated zone in the middle of the approach channel. Although the Toronto East Headland appears to be a source of contaminants to local sediment within the vicinity, it is generally secondary to the flow of suspended solids discharged from the Don River and the Main WPCP.

Most of the contaminated areas exhibit elevated levels of organic material, nutrients, metals, solvent extractables and PCBs. Contamination of the outer harbour is restricted primarily to metals.

The main concern related to contaminated sediment lies in the potential for uptake by biota. Contaminated sediments appear to be a significant source of PCBs, copper, zinc, mercury and iron to benthic organisms. Sediment does not appear to be the main source of pesticides, lead, cadmium or manganese in most cases. These latter contaminants appear to accumulate primarily through uptake from the water, especially in the vicinity of point sources.

The uptake of contaminants by biota is strongly influenced by the organic content of the sediment. The most heavily contaminated areas generally have a high organic content which binds the contaminants and makes them less available to benthic organisms. As a result, the concentrations of contaminants in benthic tissue are often similar in the organisms collected in heavily contaminated and relatively clean areas.

Aquatic Biota

The aquatic community is stressed along the Toronto waterfront, especially in the vicinity of water pollution control plant (WPCP) outfalls, tributary mouths and areas of poor water circulation, such as embayments.

Areas around the WPCP outfalls lack benthic organisms as a result of chlorine and ammonia toxicity. Benthic diversity is low along the north shore of the Inner Harbour, near the river mouths of the Don and Humber Rivers, and in Humber and Ashbridges Bays. Fauna in these areas are dominated by

species indicative of organic enrichment. Overall densities are lower than in the past, suggesting some reduction in organic content. There is no clear evidence of toxic impacts on benthic organisms, but contaminant levels in sediment in these areas could limit future colonization by other species as organic conditions continue to improve.

Collections of fish along the Toronto waterfront in 1986 and 1987 were dominated by species such as white sucker and rainbow smelt. This dominance is indicative of general environmental conditions and appears to be unrelated to seasonality. No part of the Toronto waterfront is sufficiently degraded as to exclude fish. Visual inspection of fish captured at various locations showed them to be healthy, with evidence only of fungal infections and lamprey scars. There can be little doubt however, that the fishery is under stress. Exceedences of the Provincial Water Quality Objectives (PWQO) for cadmium, copper, iron, lead, nickel, zinc and lindane occur near the river mouths and in the immediate vicinity of the WPCP outfalls. The riverine discharges impact the fishery through degradation of important habitats. The riverine exceedences of the PWQO have been linked to urban runoff, spills, poor handling of industrial and domestic chemicals, illegal sewer connections, and combined sewer overflows. The sewage treatment plants appear to affect the fishery primarily through a loss of habitat, as a result of chlorine and ammonia toxicity. The impacts of heavy metals discharged from the WPCPs could become more significant if de-chlorination of the final effluent were to be introduced to eliminate acute toxic effects. Organic parameters, including industrial chemicals and pesticides, in the WPCP discharges rarely exceed available aquatic objectives and are generally found in trace amounts only. Tests on the effluent from the Main WPCP have shown it to be non-mutagenic.

Away from the river mouths and WPCP outfalls, the PWQO are rarely exceeded except for bacteria, phosphorus, ammonia, and phenols. The PWQO for phenols has been set to avoid tainting of edible fish.

In addition to stresses reflected by the diversity and general health of biota, bioaccumulation of contaminants is of concern along the Metro Toronto waterfront. Benthos and fish have been shown to bioconcentrate copper, iron, mercury

and zinc and organic contaminants such as PCBs, DDT metabolites, «-BHC, hexachlorobenzene, chlordane, heptachlor, aldrin and lindane. Collections of spottail shiners indicate that levels of PCBs, DDT, BHC and chlordane are decreasing, although PCB levels remain above the IJC objectives for the protection of birds and animals which consume fish. Trend information is not available for the remaining pesticides or the metals.

The levels of bioaccumulation in biota are generally uniform across the waterfront, except in the case of PCBs. Although elevated levels of contaminants do exist near point sources and areas of highly contaminated sediments, similar levels are observed in areas well removed from these sources. The data suggest that either many of the contaminants in the more polluted areas are biologically unavailable, or that the low-level ambient concentrations are sufficient to cause biota to reach an accumulation threshold, which limits further uptake in the more contaminated areas. PCB accumulations also exhibit relative uniformity except near the mouth of the Humber River. Previous work with spottail shiners has indicated elevated levels of PCBs in the lower reaches of the river. The distribution pattern suggests land-based inputs, but efforts to locate active source(s) have been unsuccessful.

Fish eating birds represent a high trophic level in the aquatic food web. During the late 1960's and early 1970's, substantial impact, in the form of reduced reproductive success and deformities, occurred as a result of organochlorine pesticide residues. By the late 1970's, decreases in organochlorine residues resulted in increased reproductive success and a significant reduction in deformities. Current reproductive rates for herring gulls and other species are considered normal.

Habitat

Much of the Toronto waterfront provides limited habitat diversity because of the natural lake features and historic development of the shoreline. The better remaining habitats exist in the wetlands near the mouths of the Rouge and Humber Rivers, in the Toronto Island lagoons and in the embayments created by lakefilling projects. The importance of the Rouge and Humber marshes as spawning and rearing areas is generally recognized. Fish collections in 1987 indicate that Northern Pike are using the Toronto Island lagoons for spawning, although the species remains scarce. Significant improvements in abundance and diversity have been associated with the embayments associated with lakefills.

All of these habitats are depositional areas for contaminated sediments released from the point sources, storm and combined sewers and rivers. Lakefilling has also led to localized contamination through introduction of contaminated fill. Improvements are needed in the control of material used in fill, and there is a need for a general reduction in the contamination caused by other sources if existing habitats are to be protected and improved.

The rivers draining to the Toronto waterfront also provide important habitats. The lower reaches of all of Toronto's watersheds have been degraded through development. Conversion of the forest first to agriculture, and then to an urban environment, has led to increases in temperature, in-stream erosion, sediment production and chemical contamination. The riverine fishery is most severely impacted on a continuing basis by changes in physical habitat and non-toxic water quality problems such as temperature and suspended sediment. Intermittent releases of toxic substances, as a result of poor handling and release of industrial and domestic chemicals to storm sewers, and spills, have a severe, but short-lived, effect on the fishery. Urban runnoff, with its high concentrations of heavy metals, represents a significant, but intermittent, stress on the riverine fishery. Urban runoff frequently leads to exceedences of the PWQO, but the association of the toxic contaminants with suspended solids diminishes their availability to fish. As a result, the abundance and diversity of fish species is more strongly affected by temperature than by toxic chemicals in rivers. The

significance of urban runoff in terms of toxic impacts is greater in depositional areas, such as the river mouths and the lake, where contaminated sediments accumulate and where bioaccumulation can be a factor.

The restoration and protection of riverine habitat will require both a general reduction in the urban impacts on water quality and development of comprehensive strategies for fisheries management and habitat rehabilitation. Improvements in water quality alone are not likely to yield major improvements in the fishery resource in urban streams.

Drinking Water

Knowledge of the number of toxic substances entering Lake Ontario from both local and remote sources has led to concerns regarding Toronto's drinking water. Since 1986, Environment Ontario has been conducting the Drinking Water Surveillance Program (DWSP) at 47 water treatment plants throughout Ontario. Each of the three major treatment plants in Toronto is monitored monthly. Samples of treated drinking water collected under this and previous surveillance programs, have never recorded an exceedence of any health-related objective for toxic substances, set by either Ontario, the federal government, or any other known agency, including the World Health Organization. Health-related guidelines do not exist however for many chemicals. Work on developing additional guidelines is continuing in all jurisdictions. DWSP currently monitors over 160 parameters. The list of parameters measured is continually updated to reflect lower detection levels, add new chemicals of concern and delete chemicals which are never detected.

Protection of Toronto's drinking water supply must entail both local and lake-wide efforts to reduce the discharge of toxic substances. Continuation of a comprehensive monitoring program is warranted.

II. CONTAMINANT SOURCES

The sources of contaminants affecting the Metro Toronto waterfront are diverse and far ranging. They include discharges from water pollution control plants and sewers, deposits of contaminated sediments, lakefilling activities, atmospheric deposition and discharges to Lake Ontario from "remote" sources such as the Niagara River.

Water Pollution Control Plants (WPCP)

Five WPCPs operate within the Metro Toronto RAP study area. The largest of these, the Main, Humber and Highland Creek plants, discharge to Lake Ontario. The North Toronto plant discharges to the Don River, while the small Kleinburg plant discharges to the Humber River.

The three plants discharging to the waterfront are the largest sources of nutrients, metals and organics. By way of example, these plants account for over 70% of the phosphorus and over 60% of the copper loads to the waterfront. The significance of WPCP loadings is not surprising since they also account for a large portion of the volumetric discharge to the lake, representing 44% of water released. In comparison, the annual flows from the Humber and Don Rivers account for 21% and 13% of the total discharge to Lake Ontario within the study area. Despite their large volumetric input, the WPCPs are not the principal source of all contaminants. They account for less than 10% of the suspended solids load and less than 25% of the lead load.

The impacts of the WPCP outfalls on the different beneficial uses is variable. Through input of the largest phosphorus load, they contribute to the frequent exceedence of the PWQG in the lake. This occurs despite phosphorus removal at all plants and compliance or near-compliance with IJC guidelines for phosphorus loading. Suspended solids discharged from the WPCPs are more contaminated than those from the rivers. Overall impacts of these solids are mitigated because the load of suspended solids from the WPCPs is small compared to the rivers.

WPCP discharges have several impacts on the biota along the waterfront. The most evident impact is the toxic effect of the chlorinated final effluent at the point of discharge.

Benthic organisms are usually absent in the areas immediately surrounding the discharges. Contaminant levels in the sediments near the outfalls are often high and indicative of the continuous discharge of contaminants. The continuous loadings from the treatment plants contribute to the overall degradation of the waterfront which produces the uniform bioaccumulation patterns observed in biota.

The discharge from WPCPs does not have a significant influence on the bacterial densities at public beaches during the summer. There is no evidence that the plant discharges are adversely affecting drinking water intakes. The importance of treatment plant discharges in terms of the chemicals responsible for fish consumption advisories is minor compared to other sources.

In general, the water pollution control plants are well operated. The need to improve outfall siting and reduce or eliminate by-passes and overflows during wet weather has been recognized. Regulations produced through the Municipal-Industrial Strategy for Abatement (MISA) will set effluent limits on the discharge of contaminants.

Sewers

Because of their distribution, the impacts of sewer discharge in the form of dry weather flow, urban runoff and combined sewer overflow, have far-reaching impacts on the beneficial uses along the Toronto waterfront. There are over 60 combined sewer overflows and several thousand storm sewer outfalls which discharge to the waterfront and rivers within the study area. Storm sewers and combined sewer overflows, either directly to the Lake or to the rivers are the predominant source of bacteria impacting beach areas. Storm sewers are a significant source of nutrients, metals and pesticides.

There are several reasons for the contamination caused by sewer systems. Combined sewer overflows result in the release of diluted sanitary sewage to the receiving water and therefore the discharge of bacteria, and at times, industrial and domestic chemicals. Combined sewer regulators occasionally malfunction, resulting in the discharge of raw sewage during dry weather. During rainstorms, storm sewers

discharge accumulations of bacteria (originating from pets and wildlife), heavy metals (from atmospheric deposition and traffic), nutrients and pesticides (from lawn maintenance). They also discharge small volumes of sanitary sewage during dry weather as a result of infiltration and illegal sanitary connections to the storm sewers. Storm sewers provide a pathway for contaminants, released through the poor handling of industrial and domestic chemicals, spills and intentional dumping, to enter the receiving water.

Sewer inputs contribute to virtually all of the water quality problems along the Toronto waterfront. The most pronounced impact is on swimming because of the discharge of bacteria close to public beaches or to the rivers. Storm sewers also act to convey the pollutants which build up on land as a result of industrial and domestic activities and atmospheric deposition from both local and remote sources. As a result, they contribute to the general degradation of the waterfront and the problems with sediment contamination, stress on aquatic communities, and disruption of habitat.

In-Place Sediment and Lakefilling

In-place contaminated sediments impact the waterfront primarily through the disruption of the aquatic community and loss of habitat. There is no evidence to suggest impacts on the drinking water supply. Bacteria can survive in sediment, and through resuspension, can contribute to bacteria densities at beaches. This is a problem more associated with dry weather inputs from sewers, than with in-place sediments.

Lakefilling activities contribute contaminants to the waterfront but the impacts have been found to be localized and have less of a general impact than the discharges from the WPCPs and the sewer systems. Lakefilling usually creates an area whose contaminated sediments from other sources can accumulate.

The need to reduce contamination of sediments and to improve lakefilling quality controls is generally recognized. Whether specific remedial measures aimed at removing or inactivating in-place sediments is warranted, is presently unknown. Accumulations of contaminants in biota suggest that general degradation may be more important than localized deposits of contaminated sediment.

Atmospheric Deposition

Limited information is currently available to allow quantification of the deposition of contaminants from the atmosphere. The data available is useful only for preliminary estimates which suggest that direct deposition of contaminants to Lake Ontario is small in comparison to other sources such as the WPCPs. Deposition on land is likely to be more significant.

The Environment Ontario Air Resources Branch has recently established a toxics deposition and monitoring site on the Toronto Islands. This station will provide information on the deposition of persistant organics such as PCBs and DDT, and heavy metals such as cadmium and lead. This information will be used in estimating loads from the atmosphere. At present, the impacts of atmospheric loadings can only be interpreted through the loadings from storm sewers, as accumulated pollutants are washed off the urban lands.

III. REMEDIAL PROGRAMS

Many studies and programs have been initiated in the Metro Toronto RAP area to alleviate specific local problems. In addition, provincial and joint federal-provincial programs are underway which will have a major affect on reducing contamination of the Metro Toronto waterfront. The Metro Toronto RAP will co-ordinate the various programs underway in the Toronto area and will, through public consultation, determine additional remedial measures needed to restore beneficial uses.

Great Lakes Water Quality Agreement (GLWQA)

The 1978 GLWQA was amended by protocol on November 18, 1987. Annex 2 of the amended agreement established the basis for the development of Remedial Action Plans and Lake-wide Management Plans. The Metro Toronto Remedial Action Plan is one of seventeen RAPs underway in Ontario.

The Lake Ontario Toxics Committee was formed to develop the Lake Ontario Toxics Management Plan. A draft plan and summary have been produced and made available for public discussion. Five public meetings have been held, including one in Toronto.

The draft plan outlines the following goals:

- reduction of chemical inputs in the short-term
- virtual elimination of persistent toxics in the Lake in the long-term
- achievement of protective ambient levels in the interim

The draft plan recommends focusing corrective activities on the Niagara River and the seven IJC areas of concern (RAP sites) in Lake Ontario, one of which is the Metro Toronto waterfront.

In addition to the RAPs and the Lake-wide Management Plans, Environment Ontario and Environment Canada are pursuing several activities in support of their commitment to the GLWQA.

- Studies and research are being continued by the COA Polluted Sediment Committee. The program is to address the impact of contaminants in sediment on the overlying water quality and aquatic biota, in order to develop guidelines and strategies for the management of contaminated sediments.

- Environment Ontario has undertaken the development of sediment quality guidelines. These guidelines will indicate the sediment concentrations necessary to protect beneficial uses and will supplement the Open Water Disposal Guidelines for Dredged Material.

- Guidelines governing the acceptable levels of contaminants in biota are also under development by Environment Ontario. A limited number of biologically based objectives (i.e. for PCBs, DDT and other pesticides) are currently stated in the GLWQA (1987). The list of contaminants will be expanded.

- Monthly monitoring of over 160 chemicals is continuing under the Drinking Water Surveillance Program. As noted previously, the list of contaminants monitored is constantly reviewed and revised based on contaminant occurrence, advances in technology, and new information on health effects.

- Environment Ontario is developing a provincial policy to establish the methods and quality controls to be used in all lakefilling projects. As an interim measure, more stringent fill testing and placement requirements, which will govern all fill to be placed in Toronto area lakefills, have been developed and are expected to be implemented in October 1988. The interim program replaces the Lakefill Quality Assurance Program.

- Environment Ontario has undertaken a revision and expansion of the Provincial Water Quality Objectives. The revised "Blue Book" will specify objectives for a wider range of contaminants and will more clearly

specify and limit the use and size of mixing zones. In addition, procedures for setting guidelines for contaminants for which there is insufficient information for the setting of objectives, will be laid out.

Municipal Industrial Strategy for Abatement (MISA)

Environment Ontario has embarked on a Municipal-Industrial Strategy for Abatement (MISA) which is aimed at controlling municipal and industrial discharges into surface waters. MISA's ultimate goal is the virtual elimination of persistent toxic contaminants from these discharges. For the first time, the total amount of each toxic contaminant from a polluter will be limited. This will be accomplished by requiring each direct discharger to meet standards attainable by the best available pollution abatement technology, economically achievable.

In addition to reducing pollution from direct dischargers, MISA will cut contamination from industries discharging waste water into municipal sewer systems which, in turn, discharge to the waterways. This will be accomplished through a provincial Sewer Use Control Strategy which will apply to all dischargers into sanitary sewer systems and will be enforceable. The Sewer Use Control Program will also control storm water and cooling water run-off entering storm sewers from industrial sites. Significantly high levels of contaminants in industrial run-off will trigger remedial action, including implementation of Best Management Practices or end-of-pipe treatment.

As an interim measure, while the MISA regulations are being developed, Environment Ontario has revised and augmented its existing Model Sewer Use By-Law, which is used by municipalities as the basis for regulating industrial discharges to the sewer system. The revised By-Law was released in August 1988 and is available from Environment Ontario.

The By-Law provides stricter concentration limits and more outright prohibitions of contaminants to both sanitary and storm sewer systems, and lays out the requirements for the development of Best Management Practices (BMP) plans governing run-off from industrial sites. It provides guidance for the completion of waste survey reports which

will provide municipalities with an inventory of the industrial wastes generated.

The initial phase of MISA will specify, in regulation, the maximum allowable contaminant discharges for industries and municipal sewage treatment plants. Severely impacted areas, or areas with sensitive aquatic environments may require more stringent reduction programs. These areas will receive individual aquatic monitoring, and discharge standards will be set accordingly. A pilot project is underway at the Toronto Main WPCP to assess the water quality impact-based effluent limits needed for this site, and to develop standardized water quality assessment procedures for application in other areas. The Toronto Main WPCP evaluations will, in conjunction with the Metro Toronto RAP, set the effluent standards required to restore beneficial uses.

The technologically based effluent regulations for municipal discharges are scheduled for implementation in 1993. MISA will provide the basis for the control of municipal discharges within the Metro Toronto RAP study area. The technologically based regulations will reduce the contribution of the treatment plants to the general degradation observed along the Toronto waterfront. Subsequent effluent requirements, established through the pilot site program will further reduce the impacts in the immediate area of discharge.

Toronto Area Watershed Management Strategy (TAWMS)

TAWMS was initiated to develop cost-effective measures for controlling pollutant loadings to receiving waters based on watershed needs and uses. The TAWMS Steering Committee, consisting of representatives from Environment Canada, Environment Ontario, MTRCA, and the local and regional municipalities produced the Humber River Water Quality Management Plan in 1986. The plan identified structural and non-structural measures to reduce contaminant loadings to the Humber River. The plan has been favourably received by the public, and both municipal and provincial agencies. A committee has been established to facilitate the implementation of the phase 1 recommendations. A second

plan, dealing with the Don River is underway, and will be completed in 1989.

The implementation of remedial measures under TAWMS will reduce the impacts of riverine discharges on the Metro Toronto waterfront. The Metro Toronto RAP is interfacing with TAWMS so that progress towards restoration of beneficial uses may be monitored.

Metro Toronto Waterfront Water Quality Improvement Program (WWQIP)

Early in the work conducted by the TAWMS Steering Committee, the need for remedial actions became apparent. As an interim measure, pending completion of the watershed plans, the short-term Program for Waterfront Water Quality Improvement (WWQIP) was established in 1984. By the end of 1988, approximately $50 million will have been committed or spent on:

- physical work on the watercourses, waterfront or sewer systems yielding immediate short-term benefits;
- studies and/or monitoring and investigations to provide information on which effective subsequent actions can be based;
- sewer separation, CSO and storm relief works yielding cumulative benefits over both short and long-terms.

Numerous studies and remedial actions have been undertaken under WWQIP which have begun the process of remediation required to restore the beneficial uses along the Metro Toronto waterfront. Some of the more important actions include:

- in 1984, MTRCA completed construction of the Humber River diversion wall. The wall was designed to direct flow from the Humber River farther into the lake, preventing the flow from intruding behind the Western Beaches breakwater. Subsequent beach water quality monitoring indicated that a limited amount of Humber River flow still enters the area behind the breakwater, affecting Western beaches water quality. Further studies are underway.

- approximately $29 million has been spent on accelerated sewer separation projects carried out by East York, Toronto and York under the WWQIP since 1984. Sewer separation reduces basement flooding and combined sewer overflows but increases the amount of untreated storm water conveyed to receivers. Current practice is to examine the use of retention tanks with subsequent treatment, as an alternative to sewer separation.

- based on the results of a study which investigated a number of pollution abatement alternatives for the Eastern Beaches, the City of Toronto has proposed construction of two detention tanks, one at Woodbine Beach (2,250 m^3) and the other at Scarborough Beach (16,000 m^3). The tanks are expected to reduce discharges from six storm sewers and two CSOs to two or three times per year and will therefore likely reduce the number of days the Eastern Beaches are placarded during the summer. Public hearings are currently underway.

- to remedy the placarding of the Centre Island Beaches the City of Toronto plans to construct a staged diffuser east of the breakwater. This device will generate a high velocity jet of water which acts as a curtain, deflecting contaminated Eastern Gap water away from the Centre Island Beach area during run-off events. During dry-weather periods, the staged diffuser could be operated in reverse to provide circulation water inside the breakwater as required. Construction is included under the proposed 1988 WWQIP.

- corrective works have been initiated to eliminate identified sources of dry-weather contamination such as illegal connections to storm sewers. To date, efforts have concentrated on bacterial pollution. Thirty-eight of the 228 priority outfalls have been removed from the priority list for fecal coliforms. In order to remove an outfall from this list, the municipalities must re-sample the outfall after corrections have been made to verify that the source has been removed. In many instances corrective actions have been undertaken but the follow-up monitoring has not yet taken place.

- Metropolitan Toronto and the City of Toronto have completed a study which investigated the trunk sanitary servicing requirements for the Harbour West area and the potential optimization of presently available storage capacity within the sanitary interceptor system to store and convey combined sewage (CSO) for treatment. The report found that the Mid-Toronto Interceptor (MTI) has some capacity to contain combined sewage flow, enough to reduce the frequency and volume of overflows during the summer months to 20 and 30 percent of current values respectively. Use of real-time control would further improve on these reductions.

- possible plans to retain CSO for treatment could impair the treatment efficiency of the sewage treatment plants during wet weather. Studies were therefore considered necessary to determine the impact of accepting CSO at the treatment plants. A study of the Main treatment plant and Don trunk sewer system, for this purpose, is included in the 1988 WWQIP. A study of the Humber treatment plant, initiated under the 1987 WWQIP, is nearly complete.

Infrastructure Rehabilitation Program

In 1986, Environment Ontario announced its Infrastructure Rehabilitation Program. The objectives of this program are to:

- appraise municipal needs in rehabilitating decaying and inefficient sanitary sewers and watermains
- propose cost-effective alternative remedial measures
- recommend a multi-year implementation program

The "Needs Study" is the cornerstone of this program. Needs studies usually include the following components:

- full inventory of the existing system for entry on a micro-computer.
- physical inspection of structures
- monitoring to determine infiltration/inflow, losses, leakage
- review of existing maintenance program and alternative improvements
- review of existing by-laws
- development of priorities and a multi-year implementation program to correct deficiencies within the system along with estimated costs

North York, Scarborough, Etobicoke, and York are currently conducting needs studies of their sanitary sewer systems. On completion of a needs study, Environment Ontario will provide one third of the net costs of recommended projects related to the rehabilitation, renovation, repair or replacement of existing systems under the recently announced Lifelines Program.

It is felt that the remedial efforts on-going under the TAWMS, WWQIP and Infrastructure Rehabilitation Program provide a good basis for the actions necessary to reduce the impacts of sewer discharges to the Metro Toronto waterfront. Continuing efforts will be needed and because of the size of the systems involved, priorities will need to be set. The Metro Toronto RAP, through involvement with municipalities and the public, will establish the needed priorities and time frames for implementation.

Other Remedial Programs

In addition to the WWQIP, local municipalities continue to carry out regular works and maintenance programs. These programs include, among other things:

- sewer inspection
- sewer maintenance and repair
- sewer cleaning
- catchbasin cleaning and maintenance
- street cleaning
- dog litter control
- enforcement of numerous bylaws, including plumbing and sewer use bylaws.

The Cities of North York and Toronto have both run successful Household Hazardous Waste Collection Programs. Etobicoke, Scarborough and Metro Toronto planned similar programs for 1987-1988. The City of Mississauga is setting up a year-round collection depot.

Under an MOE program called SCOUR (Students Cleaning Our Urban Rivers), a cleanup of the streams and banks of Metro river valleys was conducted by student work crews.

Water Pollution Control Plant Improvements

In addition to the effluent regulations governing municipal discharge under MISA, several improvements to the existing treatment plants are planned.

Metropolitan Toronto is considering the construction of a new outfall for the Humber WPCP. The proposed outfall will be located and designed so that the plant effluent will not affect the shore areas. Improved treatment is also proposed for the Humber WPCP.

A new outfall has been planned for the Main WPCP. It is to be designed to discharge 1700 m from shore in 15 to 20 m of water. The new outfall, planned for 1993, will improve effluent dispersion and reduce shoreline discharge. Other planned remedial measures include improvements to solids handling and addition of new aeration capacity.

For the Highland Creek WPCP, planned remedial measures include improved solids handling, upgraded aeration capacity and implementation of new decant liquor treatment facilities. These improvements are planned for 1988-1989.

A study of the future of the North Toronto WPCP was recently completed for Metro Toronto. The recommended option involves abandoning the plant, constructing a new Don Valley sanitary trunk sewer to carry existing flows to the Mid-Toronto Interceptor and using the abandoned site for holding tanks to contain CSO from the North Toronto and Leaside Trunk Sewers. This report is still under consideration by Metropolitan Toronto.

IV. FUTURE DIRECTIONS

The Metro Toronto Remedial Action Plan is envisioned as a continually evolving process of public involvement, technical and economic assessment, remedial activities and monitoring of results. Past and current efforts are a beginning, but major progress towards restoration has not been made. The challenge facing the RAP is to establish a framework for the implementation of remedial measures on an on-going basis and to develop the support and commitment necessary to ensure this implementation.

Implementation of MISA regulations and actions needed in the Niagara River are beyond the direct influence of the Metro Toronto RAP. A few local problems require further study or have no immediately effective solutions. The majority of problems facing the Toronto waterfront however, can be addressed locally, with available technology.

This report fulfills part of the requirements of the RAP by summarizing current information on the problems, sources, and remedial measures underway. The next phase of the RAP process will involve confirmation of the use goals for the Toronto waterfront and identification and costing of the remedial measures, beyond those already underway. Once the needed options and costs are established, priorities can be set, resources requirements can be specified, and the agencies responsible for implementation can be identified. Schedules for implementation and the allocation of the necessary resources will be the key to effective remediation.

and will be dependent upon the level of community support established through the RAP process. Monitoring of progress and revision of the RAP, as necessary, will lead to the ultimate restoration and protection of beneficial uses.

In order to accomplish the goals of the RAP, the RAP team will continue to work to establish a consensus on the RAP by:

- continuing and expanding its public information program
- continuing research and the monitoring of progress of established programs
- expanding the RAP team to include representatives from Metropolitan Toronto and the City of Toronto, with the possible addition of a representative of the public-at-large if requested
- establishing a technical advisory committee consisting of staff representatives from all municipalities
- holding a workshop in October 1988 to discuss the current environmental status and remedial programs, confirm use goals, and provide direction for additional remedial measures to be investigated
- establishing a public advisory committee, or alternately, continuing regular workshops to gain public input
- producing and making available fact sheets and discussion papers on issues

Discussion and written comments on this report, desired goals, and the RAP process are welcome. The discussion and comments received, either directly, or through the October workshop, will be reflected in future reports and discussion papers, and will assist the RAP team in deciding the directions to be taken in the Metro Toronto Remedial Action Plan. Please send written comments to:

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Remedial Action Plan
Plan d'Assainissement

Canada Ontario

Canada-Ontario Agreement Respecting Great Lakes Water Quality
L'Accord Canada-Ontario relatif à la qualité de l'eau dans les Grand Lacs